

EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE
LONDON AND SOMERSET DISTRICTS, DANIEL BOONE NATIONAL FOREST, KENTUCKY

BY

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INTRODUCTION

A biological evaluation for southern pine beetle was conducted on the Somerset and London Districts (Figure 1) of the Daniel Boone National Forest during December and January, 1975-76. An earlier evaluation (Thompson and Bassett, 1975) had indicated that Ips and black turpentine beetles were the predominant causes of spot killing of pines on these Districts. Subsequent reports from the National Forest suggested that southern pine beetle had also become prevalent, thus prompting this second evaluation.

The infestation is part of a Southwide outbreak of southern pine beetle that now involves 13 states. Southern pine beetle infestations were first officially reported in Kentucky in the Spring of 1975.

METHODS

A 50% aerial sketchmap survey was conducted on each district.^{1/} A portion of the spots detected in the survey were examined on the ground to determine the cause of mortality and the extent of the southern pine beetle population.

TECHNICAL INFORMATION

Insect - Southern pine beetle, *Iendroctonus frontalis* Zimm.

Hosts - Southern pine beetle is a native forest pest that will attack all species of southern yellow pine. Susceptible southern yellow pines on the Daniel Boone National Forest are Virginia (*Pinus virginiana* Mill.), shortleaf (*P. echinata* Mill.), and pitch (*P. rigida* Mill.)

^{1/} Detection of forest pests in the Southeast. 1970. USDA, USFS, SA, S&PF, Div. of FPM, Pub. S&PF-7, Atlanta, GA. 51 pp.

Type of Damage - Death of the tree is the result of mining in the cambium by the southern pine beetle as it constructs egg galleries. The beetle also introduces blue stain fungi, *Ceratocystis* spp., which slow down or block conduction of water in the stem. The size of an infestation may range from a single tree to several thousand trees.

Life Cycle of the Beetle - Southern pine beetles attack in pairs and construct a winding gallery in the cambium. Eggs are deposited in niches along the sides of the galleries. The eggs hatch into whitish grubs that further mine the cambium and then construct cells in the bark where they pupate and change to adults. The new adults then mine through the bark to emerge. The complete life cycle takes about a month during the summer, and as many as four or five generations may be produced annually in the area.

RESULTS AND DECISIONS

Table 1 summarizes the results of this evaluation.

Survey results indicate that southern pine beetle populations do occur at low levels on both districts: 1.42 spots/M acres host type on the London and .79 spots/ M acres host type on the Somerset District. There was an average of 5.3 and 1.5 infested trees/M acres host type on the London and Somerset Districts, respectively. Populations are expected to be low during the initial stages of a southern pine beetle infestation.

Most beetle activity occurs in areas where the trees have been under stress. Both districts had experienced droughts during the summer of 1975. Southern pine beetle spots examined on the ground were usually associated with lightning struck trees, tornado damaged trees, trees attacked and weakened by black turpentine and Ips engraver beetles, and dense overmature stands.

RECOMMENDATIONS

Currently, southern pine beetle spots are small, containing only a few trees. Control now might significantly reduce the likelihood of an outbreak situation. There are salvage operators in the area who are willing to work with small, scattered volumes of timber. They can do timely cutting and removal of southern pine beetle infested trees.

Any control action taken should follow those procedures outlined in FM-5250.

1. Removal of Infested Trees by Commercial Sale or Administrative Use. When infested trees of merchantable size are accessible, they should be removed by commercial sale or administrative use procedures. Logging of the infested material should begin immediately. Contract time limits should insure rapid removal.

Where practical, and if host type is present, a 40- to 70-foot buffer strip should be marked and cut adjacent to and ahead of the most recently infested trees. This practice is effective in reducing the possibility of "breakouts." When only a small volume of infested merchantable material occurs in a spot, non-infested trees surrounding the spot may be marked to provide an operable cut.

The order of priority for removing beetle infested timber from a spot should be as follows:

Trees having nearly developed broods (usually the red and fading trees)

Trees having young broods (usually the green, recently infested trees)

Trees in the buffer zone

2. Piling and Burning. Unmerchantable or inaccessible southern pine beetle infestations can be suppressed by cutting, piling, and thoroughly burning the bark of infested trees. The entire bark surface must be thoroughly burned to insure effective control. The order of priority for cutting, piling, and burning infested trees, particularly the large spots, is the same as paragraph (1) under removal of infested trees by commercial sale or administrative use. Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts" every effort should be made to locate and treat all green infested trees during the piling and burning operation.
3. Chemical Control. Chemical formulation recommended for southern pine beetle control is a 1/2 percent Lindane spray with No. 2 fuel oil as the carrier. This may be formulated from a 20-percent lindane emulsifiable concentrate or oil concentrate at the rate of 11 pints of concentrate in enough fuel oil to make 55 gallons of spray. (Ratio of one part 20-percent lindane EC to 39 parts No. 2 diesel fuel).

Cut, limb, and buck all infested trees into workable lengths. Spray the infested bark surface to the point of run-off. A compressed air sprayer (3-gallon capacity or equivalent) is an ideal applicator. Infested logs must be turned two or three

times to insure complete treatment of infested bark. Spray stumps and bark removed by woodpeckers. Low pressure sprayers may be used to treat large, accessible infestations.

The order of priority for cutting and spraying infested trees in large spots is the same as paragraph (1) under removal of infested trees by commercial sale or administrative use. Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts" every effort should be made to locate and treat all green infested trees during the chemical control operation.

Never spray trees from which southern pine beetle brood had emerged. Natural enemies of the southern pine beetle in these trees can then complete their development. To prevent aerial spotters from mapping treated spots, cut trees with red needles from which beetles have emerged.

Instructions for minimizing the adverse effects of mixing, transporting and storing pesticides, applying pesticides and disposing of pesticide containers and excess chemicals are outlined in section 8.3 of the Forest Service Health and Safety Code and FSM 5242.21. Detailed safety procedures should be outlined in the project suppression plan.

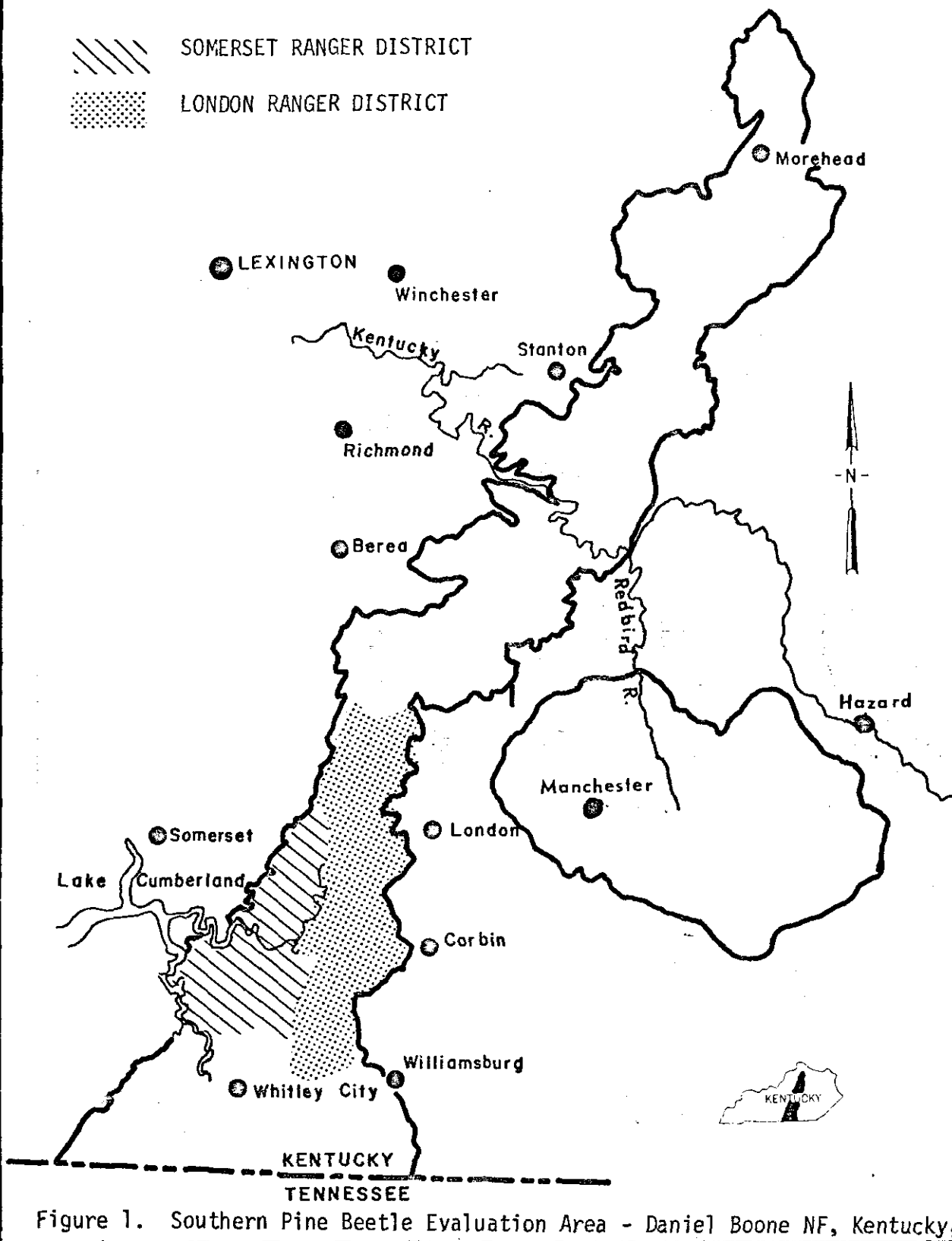
4. Reexamination of Treated Areas. Reexamine areas where infested trees were removed by commercial sales, piled and burned, or chemically treated within two or three weeks after treatment to check for additional infested trees. If additional trees are found, treat them.

Another evaluation will be conducted on the Daniel Boone National Forest in July to determine the extent of the southern pine beetle infestation at that time.

REFERENCES

Thompson, J. H., and Bassett, R. F. 1975. Evaluations of Southern Pine Beetle Infestations on the Daniel Boone National Forest, Kentucky. USDA, USFS, SA, S&PF, FPM, Report No. 76-1-9.

DANIEL BOONE NATIONAL FOREST KENTUCKY



PRECAUTIONARY PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key -- out of the reach of children and animals -- away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Department of Agriculture, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.

Table 1. Summary of southern pine beetle survey data for the London and Somerset Ranger Districts, Daniel Boone National Forest, Kentucky, January 1976.

			Ownership Unit
			London Ranger District : Somerset Ranger District
1. Results compiled from data collected during the aerial phase of the evaluation:			
Survey type	Sketchmap	Sketchmap	
Date of aerial survey	12/24/75	12/24/75	
Total acreage surveyed	194,709	138,445	
Total susceptible host type	97,440	69,225	
Total number of spots within the survey boundary	138	55	
Spots per M acre of host type	1.42	.79	
Average spot size (trees).	4.1	2.4	
Range of spot sizes (trees).	1-50	1-20	
2. Results compiled from data collected during the ground and aerial phases of the evaluation:			
Date of ground phase	1-6-76	1-7-76	
Infested trees per M acre of host type	5.3	1.5	
Total number of infested trees within the survey boundary . . .	516	104	
Ratio of green infested to total red and fading trees.	1:4.0	1:1.5	
Total volume of infested trees	13,777 cu. ft.	2,641 cu. ft.	